sports/hobbies, 17% indicated hypertension, diabetes or thyroid problems. At baseline, the criteria were met on both physical exam and questionnaire among 6% for left and 9% for right rotator cuff syndrome, 2.6% for left and 4.8% for right lateral epicondylitis, 6.6% with right and 2.9% left flexor tendinitis-peritendinitis. Carpal tunnel syndrome based on questionnaire was 15.5% on the right, 10.4% on the left; based on nerve conduction criteria it was 14.1% on the left and 27.1% on the right. Based on both questionnaire and nerve conduction, 4% had left and 7.7% had right CTS. By preliminary exposure category, the difference in point prevalence of carpal tunnel syndrome on nerve conduction and questionnaire was significant.

Respiratory diseases I
Oral session 04

013 Airway inflammation in waste handlers exposed to bioaerosols assessed by nasal lavage

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Background. Exposure to bioaerosols during work may cause respiratory health problems. Workers involved in household waste and compost handling have experienced organic dust toxic syndrome (ODTS), airway irritations and occupational asthma (1-3). The aim of this work was to examine upper airway irritations in 22 organic waste collectors and 6 compost workers by nasal lavage and to correlate these findings with exposure to different bioaerosol components.
Methods. Total cells, cell differentials, IL-8, MPO (myeloperoxidase) and ECP (eosinophilic cationic protein) were determined in nasal lavage before work start on Monday and the following Thursday. Personal full shift exposure measurements were performed on each of the three days of work between. Bacteria and fungal spores were analysed by fluorescence and scanning electron microscopy, and endotoxin and (1-3)-glucans were analysed by the Limulus lysate test.
Results. The percentage of neutrophils in NAL increased from Monday (28%) to Thursday (46%) and correlated with an increase in ECP from 5.1 ng/ml to 9.3 ng/ml, IL-8 from 650 pg/ml to 900 pg/ml and MPO from 210 ng/ml to 330 ng/ml. Acoustic rhinometry revealed that the degree of swelling in the nasal mucosa tended to correlate to the increase in percentage of neutrophils (p=0.07). Significant correlations between the Thursday levels of neutrophils, MPO and IL-8 ($rs_{pearman}$=0.47-0.54, p<0.01) and exposure to fungal spores (range 0-2.0x10^6/m^3) and endotoxin (range 4-183 EU/m^3) measured the day before, and the median exposure to (1-3)-glucans (range 3-217 ng/m^3), respectively, were observed.
Conclusions. The results from this study suggested that the moderate exposure levels during waste handling induced an upper airway inflammation reflected by the nasal lavage of the workers. This inflammatory reaction was characterised by an increased influx of neutrophils from Monday to Thursday which was associated with an increase in the inflammatory enzymes MPO and ECP, and swelling of the nasal mucosa. The inflammatory reactions were correlated to various microbial agents like fungal spores, endotoxins and (1-3)-glucans, but in a complex manner.
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014 Occupational exposures in relation to asthma in the French PAARC survey

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Background. Asthma is the most common occupational respiratory disease. In population-based surveys, occupational exposures are difficult to estimate and few analyses on the role of occupational exposures on asthma have been performed. The aim of the analysis was to study associations between occupational exposures and asthma in the PAARC (Pollution Atmosphérique et Affections Respiratoires Chroniques) survey carried out in 1975 in seven cities.
Methods. Three estimates of exposures in the last job were available (self-reported exposure and 2 job exposure matrices (JEM)). A population-specific JEM [Le Moual N et al. OEM 2000; 57: 126-32] was constructed from the percentage of subjects who declared themselves exposed to dusts, gases or fumes. This JEM was built in such a way that the prevalence of exposure would be the same by both the JEM and the self reported data. The asthma-specific JEM [Kennedy et al. OEM 2000; 57: 635-641] allowed estimation of exposure in 22 groups including 18 specific agents classified as either high or low molecular weight asthmagens. The JEM was applied without the recommended 'expert review' step. Asthma was assessed by questionnaire and severe asthma was defined as asthma plus FEV1 <80% predicted value. The analysis was performed on 14505 subjects (7467 men (500 asthmatics), 7038 women (474 asthmatics)), aged 25-59 years old, with information on job code and self-reported occupational exposure to dusts, gases and fumes.
Results. In both genders, using the population specific JEM no association was found between exposure to dusts, gases and fumes and asthma whereas a previous analysis showed significant associations with self-reported exposure. When the asthma JEM was applied, a significant association with asthma was found in men but not in women. For specific asthmagenic agents, associations were observed for latex (1.30[0.97 - 1.75]) and industrial cleaning agents (1.49[1.04 - 2.12]). Analyses were performed after stratification according to asthma severity. Moderate asthma, but not severe asthma, was associated in men with highly reactive chemicals (1.98[1.06 - 3.71]) and latex (1.99[0.96 - 4.11]). Severe asthma was associated in men with flour (2.73[0.85 - 8.84]) and in women with highly reactive chemicals (1.81[0.99-3.33]), industrial cleaning agents (2.30[1.15 - 4.61]) and high molecular weight agents (1.65[0.97-2.81]).
Conclusion. Associations between specific asthmagenic agents and asthma were observed in the PAARC survey despite the lack of expert step initially planned to be used with the asthma JEM. Significant relationships found for cleaning agents support other recent results. This analysis confirmed the interest of the use of JEM in large surveys.

015 Building-related respiratory disease in college faculty and staff

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Background. Recurrent complaints of new onset asthma and building-related symptoms persisted after 14 environmental investigations over 20 years. We undertook an epidemiologic survey of college employees in 12 campus buildings to assess symptom and diagnosis excesses in relation to environmental indices of water damage in their offices, classrooms, and laboratories.
Methods. Participants completed questionnaires regarding symptoms, diagnoses, smoking, and job location. Trained industrial hygiene team pairs scored occupied rooms for mold odor, visible mold, stains, and moisture, the results of which were time-weighted by job location in exposure indices for individual participants. Health outcome prevalences were examined by building characteristics and exposure indices. We used logistic models to obtain odds ratios for symptoms in relation

to exposure indices, taking into consideration faculty/staff status, gender, age, cigarette smoking, reported allergies, reported use of latex gloves, and year of hire.
Results. About half of the 393 participants (71% response rate) reported wheeze, chest tightness, or shortness of breath. Sixty percent of those reporting these symptoms noted them to be either less severe away from work or required less medication away from work. Overall, 17% reported physician-diagnosed asthma, about half of whom noted post-hire onset or work-exacerbation. Occupants of water-damaged buildings had statistically higher prevalence of any post-hire chest symptom (44%) compared to occupants of other buildings (17%). Work-related chest symptoms followed the same pattern (34% and 10%, respectively). Visible mold significantly increased the odds of work-related lower and upper respiratory symptoms (wheeze (2.0), chest tightness (2.6), shortness of breath (2.6), nasal symptoms (1.7), and sinus symptoms (2.0)). Water stain indices were significantly associated with odds of work-related wheeze (2.6), work-related nasal symptoms (4.4), work-related sinus symptoms (3.8), and work-related throat irritation (2.0). Mold odor was associated with work-related throat irritation (2.3) and any work-related upper respiratory symptom or eye irritation (2.3). A subset of participants in the nursing department had relocated from a water-damaged building in the same year of the survey; 54% reported chest symptoms prior to the move, of whom 36% reported improvement in symptoms or breathing problems after relocation to older buildings.
Conclusions. Building-related excesses of chest symptoms occurred in water-damaged buildings and were associated with indices of potential mold exposure. Exposure indices from visual and olfactory scoring may be useful in predicting risk and need for remediation, overcoming limitations of available bioaerosol measurement methods in predicting hazard.

016 Longitudinal study of lung function in coke oven workers
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Background. While the lung function of coke oven workers has been investigated in several cross-sectional studies during the last thirty year, we have found no reports of longitudinal studies. Yet, it is only a longitudinal study that can provide direct information about changing lung function of individuals. In our study population, a longitudinal study was conducted to investigate change in lung function of coke oven workers in relation to exposure to coke oven emissions.
Methods. The study population was 580 male workers with at least two sets of lung function measurements (FVC, FEV1, FEV1/FVC and FEF25-75%) who were followed between 1978 and 1990. An annual rate of change (time slope) for age and height adjusted lung function index was estimated for each subject. Then, the 'time slope' was treated as the response variable in a weighted multiple regression analysis with selected predictors which included job classification and years of work exposure.
Results. For all 580 subjects, each year of working in the 'Operation' group (the most exposed) was found to increase the FVC decline by around 0.7 ml/year (p=0.02). After the exclusion of 111 subjects without detailed work history, the above finding was confirmed and each year of exposure in 'Operation' was also found to increase the FEV1 decline of around 0.8 ml/year (p=0.03). The effect of one year of work exposure in 'Operation' is equivalent, in terms of the reduction in lung function, to an estimated 2.0 pack years of smoking for FVC and 0.7 pack years of smoking for FEV1.
Conclusion. The findings from our longitudinal analysis on the lung function of coke oven workers are consistent with those from our previous cross-sectional study (which are, in turn, similar to those from other published cross-sectional studies). Work duration in 'Operation' contributed to excess annual declines in FVC and FEV1.

017 Risk factors for respiratory symptoms in European and Californian farmers
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Objective. To determine the prevalence of self-reported respiratory symptoms in European and Californian farmers, and its relation to regional and occupational factors.
Method. All farmers participating in the 1995 surveys on respiratory health performed in Europe (n=7188) and California (n=1839) were included in the present cross-sectional study. A questionnaire of respiratory symptoms and farming characteristics was available from all farmers. For the present study regional and farming-related factors associated with respiratory symptoms were assessed using logistic regression models, after adjustment for covariates (OR, 95% CI).
Results. In European farmers the prevalence of rhinitis (10-15%) and asthma (2-3%) was lower than in Californian farmers (20-25% and 4-7% respectively), but the prevalence of chronic bronchitis was much higher in Europe (8-12% versus 4-6%) (p<0.01). Chronic bronchitis was associated with the cultivation of oil producing plants in European farmers (1.3, 1.1-1.6), but the high prevalence of rhinitis and asthma in California was not occupation-related. After stratification and adjustment for covariates, working in Europe was a risk factor for chronic bronchitis only in non-smoking farmers (never + former), either when they work with animals (4.3, 2.1-8.6), cultivate crops (3.4, 2.2-5.2) or are involved in mixed farming (2.7, 1.2-5.8).
Conclusions. The high prevalence of chronic bronchitis in European farmers is attributable to a high number of non-smoker European farmers who report chronic cough and sputum.

METHODS I
ORAL SESSION 05

018 Study of the interaction between diabetes mellitus and employment
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Background and objectives. Diabetes mellitus can influence the working capacity of the affected person. The objectives of the study were to identify the impact of diabetes on employment status and related characteristics.
Methods. We analysed data of the Belgian National Health Survey, executed in 1997, which included a representative sample of the Belgian population (0-97 year; mean age 38.5 year). The questionnnaire provided information about different health-related issues, including employment.
Results. Diabetes was reported by 295 of the 10197 respondents (2.9%), 251 (85%) of which took medication. There were no significant differences in education level between diabetic and non-diabetic persons, after controlling by gender and age. More diabetic patients were non-employed compared with non-diabetic persons (controlled by gender and age; OR=2.57, p<0.001). Diabetic persons not taking medication did not differ in the employment rate compared to non-diabetic persons (controlled by age and gender; OR=0.413, p=.114). The reason for non-employment in diabetic persons was more related to illness and handicap compared with non-diabetic persons (controlled by gender and age; OR=3.33, p<.001). Other reasons for non-employment like pension, unemployment, being student and doing housekeeping, did not differentiate between diabetic and non-diabetic persons. No differences were found in the prevalence of diabetes in the private and governmental sector. Insulin-dependent diabetics are more likely to work for the government than non-diabetic persons (OR=2.06, p=.022). As for the educational level, there were no differences between diabetic and non-diabetic persons con-

Volume 93, n. 5 **Settembre - Ottobre 2002**

Rivista fondata nel 1901
da Luigi Devoto

Issn 0025 - 7818

La Medicina del Lavoro

RIVISTA BIMESTRALE DI MEDICINA DEL LAVORO E IGIENE INDUSTRIALE
ITALIAN JOURNAL OF OCCUPATIONAL HEALTH AND INDUSTRIAL HYGIENE

REDAZIONE La Medicina del Lavoro
Clinica del Lavoro «L. Devoto»
Via San Barnaba, 8 - 20122 Milano (Italy)
Tel. 02/50320125 - Fax 02/50320126

CASA EDITRICE Mattioli 1885 spa - Casa Editrice
Via Coduro, 1/b - 43036 Fidenza (PR)
Tel. 0524/84547 - Fax 0524/84751
e-mail: edit@mattioli1885.com
www.mattioli1885.com (CCP N. 11.286.432)

Pubblicazione bimestrale
Direttore Responsabile Prof. Vito Foà
Autorizzazione del Presidente
del Tribunale di Milano 10/5/1948 - Reg. al N. 47

La Medicina del Lavoro è recensita su:
Index Medicus/MEDLINE; Embase/Excerpta Medica; Abstracts on Hygiene; Industrial Hygiene Digest; Securité et Santé au Travail Bit-CIS